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ABSTRACT

The articles in this monograph focus upon the use of computers in improving educational programing and administration. A description is given of a model decision-making approach to assist local school systems in adopting a computer literacy curriculum. Also included are a discussion of software selection and the components of a programing course for classroom teachers. Microcomputer applications at the university level are considered, as well as staff development in the uses of microcomputers. The following papers are presented: (1) "Computer Literacy: A Case of Curriculum Decision Making" (Loviah E. Aldinger and H. Wells Singleton); (2) "Specialized Software Selection for Speech/Language Rehabilitation" (Virginia B. Morrison); (3) "Teaching Teachers Programming: The University of Cincinnati Model" (Jeffry S. Gordon); (4) "Administrative Uses for a Microcomputer in Teacher Education: The Kent State Example" (Frank G. Cookingham); and (5) "A Model for Computer Literacy Staff Development in Teacher Education: Miami University Meets the Challenge" (Kay Walla and Robert Wendel). (JD)

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THE APPLICATION OF MICROCOMPUTERS TO TEACHER EDUCATION

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SERIES NO. 8

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THE APPLICATION OF MICROCOMPUTERS TO TEACHER EDUCATION

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THE APPLICATION OF MICROCOMPUTERS TO TEACHER EDUCATION

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1984

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INTRODUCTION

In recent years, educators have come to accept the school use of microcomputers as both positive and appropriate. In increasing numbers, school districts are acquiring microcomputers to assist administrators in managing daily affairs, to aid teachers with classroom instruction, and to enable students to develop new skills and knowledge. Some districts have established policies which require computer literacy for all high school graduates. Teacher educators have responded to the field's increasing use of microcomputers in a variety of ways. Microcomputer training at the inservice, preservice, and higher education levels has become a major responsibility for faculty members skilled in the area. Additionally, research efforts in various educational disciplines have been undertaken to document current practices and to suggest innovative microcomputer applications. Further, the development of educational software for both college and K-12 use has become an avocation shared by many teacher educators.

The articles in this monograph demonstrate teacher educators' commitment to ensuring the excellence of microcomputer applications in education. Drs. Aldinger and Singleton describe a model decision-making approach to assist local school systems in adopting a computer literacy curriculum. Ms. Morrison continues the theme of teacher educators providing specialized support to the field in her discussion of software selection. By detailing the components of a programming course for classroom teachers, Dr. Gordon supports the role of teacher educators in providing inservice activities. The remaining articles focus the theme of microcomputer applications at the university level. Dr. Cookingham provides a thorough account of the various ways in which microcomputers can be used to increase teacher educators' efficiency and productivity. The final article by Drs. Walla and Wendel presents a framework education colleges can utilize to ensure quality staff development in the use of microcomputers.

Each article contributes knowledge and experience to the growing area of microcomputer applications in teacher education. More important, each article demonstrates that teacher educators are taking major leadership roles in emerging technological areas.

Cynthia L. Warger
Linda B. Murphy

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COMPUTER LITERACY: A CASE OF CURRICULUM DECISION MAKING

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ABSTRACT

A hypothetical school district is considering the adoption of a major curriculum innovation, K-12 computer literacy. Central administration must make decisions concerning the curriculum issues of goal selection, scope, and sequence. Yet, due to the newness of computer literacy as a content area, there is limited information upon which to base decisions. The confusion and uncertainty associated with an innovation of this type and magnitude call for a pilot-test prior to full-scale implementation. The pilot-test can provide the district with valuable information concerning the feasiblity of various program options. However, a well-monitored pilot-test represents a challenge for any school district. The effective piloting of an innovation such as K-12 computer literacy requires that teachers and administrators share their areas of expertise and establish systems to communicate the results of student interaction with the new content at different grade levels.

Dr. Brown is the young, dynamic superintendent of the Lakeview Schools, a district in the process of changing from a rural to an affluent, suburban community. Dr. Brown sees computers as "the coming thing" in education, believing that the adoption of a K-12 computer literacy program will prepare Lakeview students for the technological world of the future. The computer literacy program envisaged by Dr. Brown is relatively unfocused, with goals stated only in the most general terms (i.e., "our students should have a knowledge of the capabilities of computers and how they function;" or, "all students should have a

> chance to interact with computers"). It is assumed, however, that these goals will be further refined as the program is implemented. Under this assumption initial steps are taken to introduce computer literacy: microcomputers are purchased and installed at all grade levels; software programs are ordered; and interested faculty are sent to computer classes and seminars.

The above scenario is being enacted in school districts throughout the country as yet another innovation finds its way into the curriculum. Dr. Brown's proposal that Lakeview adopt a K-12 computer literacy program requires decisions concerning what the publicly stated goals of the new program will be and what specific content will be taught when to what students. This paper describes several problematic areas which curriculum decision makers face when they are selecting and announcing goals, and when they are mapping out the scope and sequence of a major innovation. The difficulties encountered by the hypothetical district's consideration of a K-12 computer literacy program provide support for the authors' argument, in the final section of the paper, that an explicit decision be made to pilot-test an innovation of this type and magnitude prior to full-scale implementation.

WHAT WILL BE THE PUBLICLY STATED GOALS OF THE COMPUTER LITERACY PROGRAM?

As with any major curriculum innovation, the installation of a computer literacy program is going to cost money. Computer equipment must be purchased and installed; software packages must be evaluated and ordered; administrators and teachers must be trained. Because of the required investment, Dr. Brown may be tempted to make exaggerated claims about the potential benefits of the innovation. For example, it could be argued that the computer literacy program will prepare Lakeview students for a world in which familiarity with computers is essential, whether it be the world of work or of advanced schooling. Or it could be claimed that computer based instruction will improve Lakeview students' mastery of the basic skills, and develop their problem-solving abilities, while providing teachers with time to concentrate on the more creative aspects of teaching.

If Dr. Brown does make such claims for the new program, it is likely that few questions will be raised by members of the Lakeview school board or by parents of Lakeview students. Computer literacy is a new subject, and experts in this area are fond of using unfamiliar, even mysterious, terminology. Laymen will most certainly stay within the tradition of allowing educational experts extensive latitude in making decisions concerning what is considered a technical, curriculum issue (Wirt & Kirst, 1972). However, what if the promised results are not forthcoming? Before making any public statements about the new

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program, Dr. Brown should perhaps consider looking at whatever research is available concerning the use of computers in schools.

In summarizing research on the effectiveness of computer assisted instruction (CAI) drill and practice programs, Becker (1982) indicates that the results have been mixed. Some research (Fisher, 1983; Jamison, Suppes, and Wells, 1974) has shown that CAI can be effective at the elementary level, especially as a supplement to regular instruction. However, a 1981 evaluation of the use of CAI in the Los Angeles schools found that while CAI had a positive impact upon students' computational skills, it did not consistently bring about increases in students' conceptual understanding of mathematics, nor in reading and language arts (Becker, 1982). There are many problems to be solved before computer programs are developed which include appropriate sequences of material, response-contingent alternatives, user-controlled options, and feedback mechanisms (Becker, 1982). Many of the programs which are currently being used in schools consist of isolated exercises in the areas of math and science. Further, as Becker (1982) also points out, CAI drill and practice programs are often "boring and repetitious", while potentially more interesting tutorial dialogue programs, otherwise known as intelligent CAI, are only in the beginning stages of experimentation.

In the short run, overblown claims concerning the effectiveness of computer literacy might serve to defuse controversy about the cost of the new program. However, in the long run, Dr. Brown risks the danger of a backlash effect if the promised results are not achieved. This pattern seems particularly likely in the case of computer literacy, an innovation for which so many claims are being made, with so little evidence to back them up.

WHAT CONTENT WILL BE TAUGHT WHEN TO WHAT STUDENTS?

This question encompasses the major curriculum issues of scope (breadth and depth of content at a given level) and sequence (vertical organization of content between levels). It appears that in the hypothetical district an initial decision concerning scope has already been made: computer literacy will span grades K-12. However, as the new program's unfocused goals are translated into actual instruction, other issues concerning both scope and sequence must be addressed.

The Scope of the Innovation. As computer literacy is added to Lakeview's elementary level grades, for example, the scope of the elementary curriculum must expand to accommodate the new addition. However, without proper attention paid to how computer literacy will "fit" into the already scoped curriculum, the innovation could be shortlived, as teachers and students alike will be tempted to abandon the project in favor of other traditional, or better thought-out, curricula. An example of improper fit would be the requirement that third and fourth

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graders spend time completing computerized math drills which are unrelated to either the regular math curriculum or to the difficulties which a particular student is having. Improper fit also would be evident if fifth graders were required to spend an hour weekly writing graphics programs, with no decision made as to the appropriateness of the requirement or as to how mastery should be determined.

There will be no quick, easy solutions to the problem of integrating computer literacy into the overall scope of the elementary curriculum in any school district. Educational experts continue to debate the pros and cons of introducing programming skills at the elementary level. Further, until market conditions become more certain, it appears that many of the drill and practice programs will continue to consist of what Becker (1982) calls "curricular fragments", rather than "complete, text integrated tools".

The Sequencing of the Innovation. Sequence refers to the progressive, level-to-level arrangement of elements in a curricular area. The principal problem associated with sequence is that of providing students with cumulative and continuous learning opportunities in a given area such as mathematics, language arts, or, in this case, computer literacy. Some theorists maintain that sequencing is difficult to achieve because the focus remains on content, rather than on the sequence of skills and competencies which students should develop as they interact with content (Taba, 1972). The unwillingness to focus on student mastery of skills in a content sequence has often resulted in misplaced expectations and poor articulation between levels.

At hypothetical Lakeview, the issue of sequence will be raised when teachers begin debating over the optimal grade level at which content concerning the history and ethics of computer use should be introduced. Sequence questions also may be at issue when prerequisites for entry into programming courses at the high school level are discussed. A sequencing *problem* will be evident if a junior high school teacher finds that some students are bored and others are stymied by the computer literacy course required of all seventh graders.

PILOT-TEST OR FULL-SCALE IMPLEMENTATION?

Computer literacy is similar to many other educational innovations in that parents, school board members, the media, and, in this case, the computer industry itself can exert considerable pressure upon school administrators to *adopt* the program. Further, adoption may be urged while limited information is available upon which to base decisions concerning optimal procedures and materials for different grade levels. While it would be unrealistic and perhaps even unwise to expect Dr. Brown to play the cautious role of "wait and see", certain precautions can be taken to avoid the high expenditures and

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backlash effect which might result from confusion over scope and sequence issues. One recommendation is that the K-12 computer literacy program be pilot-tested prior to full-scale implementation.

Since the computer literacy program is to be installed in levels K-12, the pilot-testing should take place at the elementary, junior, and senior high school levels. The number of students involved in the pilot will depend upon factors such as the availability of trained teachers, equipment, and materials. However, it is essential that a monitoring system be established whereby teachers and administrators are responsible for gathering and communicating information concerning the effects of student interaction with the new content.

Both lateral and vertical communication networks would be necessary. The sharing of information within one level, or a lateral communication system, would address problems of *scope*. For example, if teachers at the elementary level monitored student performance on various types of programming tasks, an informed decision could eventually be made concerning the inclusion of programming in the fifth grade curriculum. The sharing of information between levels, or a vertical communication system, would address *sequencing* problems. For example, the junior high school computer literacy teacher would be better able to design a challenging, yet feasible, course if access to information concerning the content of computer instruction being introduced in the upper elementary grades and the levels of student performance on various tasks was available.

The monitoring and communication system so vital to the effective pilot-testing of an innovation can be difficult to implement. Key scope and sequence issues related to the innovation would need to be identified prior to and during the pilot-test. This identification requires the collaboration of those with expertise in the content area (teachers) and those with expertise in curriculum development and coordination (administrators). Teachers would have to become less preoccupied with their own classroom and consider the broader picture implied by attention to scope and sequence issues. On the other hand, administrators would have to be willing to delegate some of their authority as they encourage teachers to contribute aspects of their expertise to the curriculum decision-making process.

Additional obstacles to an effective evaluation of the pilot-test might be teachers' inability or unwillingness to systematically observe and record student interaction with the new content; or, key administrators' unwillingness to defer to teachers who are more knowledgeable than they are about the content area under consideration. If the collaboration within and between levels does take place, however, useful information about computer literacy program options and their feasibility in the Lakeview district will be available to those who must make decisions concerning fullscale implementation of the innovation.

CONCLUSION

The decision to proceed initially with a pilot project followed by the gradual inclusion of additional components will not be an easy one for Dr. Brown. Pilot projects often focus on a particular population such as fourth graders or gifted and talented students, and it is difficult to convince the groups who were not selected to participate that their turn will eventually come. However, when an innovation is broad in scope and little information is available, even from the experts, which could guide curricular decisions, a carefully monitored pilot test should be considered. The pilot will protect the curriculum from massive disruption, buy the district *time* to properly evaluate the innovation, and provide staff and students with the opportunity to try out various scope and sequence options. It is therefore recommended that Dr. Brown take on the difficult task of convincing parents, school board members, and faculty that a well-planned and monitored pilot test is necessary to determine how the new program can best be integrated into the already existing curriculum.

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SPECIALIZED SOFTWARE SELECTION FOR SPEECH/LANGUAGE REHABILITATION

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COMPUTER LEARNING MATERIALS, INC.

ABSTRACT

Faced with the need to provide microcomputer experiences, educators in specialized areas are finding that they often need assistance in sorting through and selecting appropriate software. This article describes the development of a catalog which identifies from existing libraries those software programs appropriate for use in speech and language rehabilitation.

New computer technology is progressing so rapidly that we find ourselves in need of guidance; yet, the information resources are in their early stages. Professionals from varied fields are sharing their experiences and knowledge with microcomputer specialists to ensure that technological advances are represented in clinical and educational applications. Educators need assistance if they are to keep current with the latest microcomputer developments.

However, specialized questions requesting information about existing microcomputer software often go unanswered. While retail stores have provided opportunities for educators to survey a broad market of educational software, teachers in specialized areas such as speech and language rehabilitation are generally left to their own resources when selecting appropriate programs. Faced with escalating demands and limited time, educators seeking specialized programs cannot be expected to complete all the necessary research on their own. Cataloging specialized software is a key to helping practicing educators select appropriate software programs. This article describes how Computer Learning Materials Inc., using an educational model, developed the "Language and Cognitive Rehabilitation Catalog."[1]

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[1] *This catalog is available from the author at Computer Learning Materials, Inc., 381 N. Maple Rd., Ann Arbor, Michigan 48103.*

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ESTABLISHING A NEED

Two unique experiences encouraged the screening of partiular microcomputer program *features* to guide users in matching a program with specific user needs. One family sought consultation in selecting educational software which would supplement a home therapy program. Their son had limited physical movement as a result of brain injury. Given the handicapping characteristic, it was necessary to locate different math, reading and recreational programs using varied screen formats and types of presentations appropriate for his rate of physical movement and academic skill level. While the son had a low learning frustration level which demanded clear presentation in the sequence of information and procedure for answering, he still needed a motivating progression of ideas and illustrations.

Using as the criteria for user access those limiting features of the particular handicap, certain software programs were selected. Although recreational microcomputer games provide various coordination skill development experiences (i.e., arcade style format with rapid movement), appropriate ones were more difficult to locate. Follow-up conversations six months later indicated steady progress in math and reading skills moving from beginning levels in addition and subtraction to multiplication. One program "Gertrude's Puzzles" (The Learning Co.), which requires the user to move shape pieces into matching shapes or color puzzles in a maze format, proved to be a difficult task for their son. However, rather than using the program for the intended goals, the parents decided to use the maze design for the rehabilitative goals of development and discrimination. On a return visit, the son proudly announced mastery of the puzzles and produced a color photo of the computer screen showing the final level of accomplishment. This experience relating the initial skill level of the individual with specialized needs in handling the microcomputer, to later stages of growth and maturity, assisted the understanding of particular microcomputer features and potential software applications.

The second example occurred when the Ann Arbor Veteran's Administration Medical Center Audiology/Speech Service Department began selecting software programs to be used in speech and language rehabilitation. Under the direction of a senior speech pathologist, a proposal which included the use of computer software as part of homebound programs was written. Again, it was necessary to try various software programs with the clients in an effort to locate those programs that could be managed with physical limitations. A format that was not frustrating due to complicated sequencing of steps, and yet, meet the desired skill development was desired. The selected programs were used under professional supervision for several months. Evaluation of the microcomputer activities using these programs re-emphasized which specific features in the software are necessary, as well as inappropriate, for persons with the handicapping condition.

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From these two experiences, specific criteria emerged which have been useful in the evaluation of software for these specified needs. While there is some software written specifically for this population, there also are many software programs for non-specialized groups which can be integrated successfully into educational and rehabilitative programs. Knowledge of these programs greatly aids the educator in quickly and effectively locating and selecting appropriate programs.

COMMERCIAL PROGRAMS SPECIFIC TO THE AREA

Specialists in the speech and language area have designed software with features most appropriate for their client population. Some of the groups pursuing these activities include the following companies. Brain-Link Software addresses auditory comprehension using digitized speech to present stimuli for comprehension responses. Programs authored by Rehabilitation Software, which is used at Saline Michigan Community Hospital for rehabilitation of brain injured persons, allows computer responses from semicomatose patients who can barely close a custom designed switch, to patients who can use a standard computer keyboard. Schneier Communication Unit of the Rochester, New York Cerebral Palsy Center has directed attention to developing programs which aid communication by presenting pictures and vocabulary that give the user an option of selecting words or phrases for spoken output through a speech synthesizer. SLP has developed reading activities for persons with aphasia in recognition and comprehension skills with auditory/visual feedback. Individual rates and mean response time also can be recorded. Sunset Software's comprehension programs use single key input to answer multiple choice selections. Hartley Courseware includes five programs operating with a cassette control device designed to turn recorded voice questions on and off under computer control. Clinical management tools have been developed to assist screening for communication disorders by Communicology Associates.

CATALOG CONTENTS

The specialized catalog was developed as a response to requests for information in the area of speech and language rehabilitation. The listed resources are intended to provide educators with a single listing source for microcomputer software programs, related speech and input devices, and consulting services. Features highlighted in the catalog are those frequently used in speech/language and cognitive training. There is no attempt to evaluate the microcomputer programs because of the varying recognized methods of screening, evaluating, and treatment. The software has been previewed by professionals from speech/language pathology, education, reading, and computer science to provide descriptions which assist clinicians and educators in selecting appropriate software.

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Specialized Software

A "code line" description at the close of each program entry aids the reader by maintaining a consistent format of information concerning pertinent features. The major features are presented in Figure 1. Educators, having identified those particular student characteristics which will make learning on the microcomputer difficult, can locate in the catalog those programs which compensate for the particular difficulties.

Input	- type of device used for program input
Gr.	- academic skill level
Lev. select	- yes or no indicates that variable skill levels can be accessed
Rein	- indicates type of reinforcement: visual, auditory, spoken
Stim. files	- clinician can change the program stimulus
Resp. scoring	- program will track user responses in the program
Store. data	- "yes" or "no" indicates that responses are stored on disk
Print	- "yes" or "no" indicates the records can be printed
Backup	- designates backup options

Figure 1. Descriptors used in the Language and Cognitive Rehabilitation Catalog.

Conclusion

The task of selecting software to provide profitable use of the microcomputer becomes more time consuming as the options increase. With expansion in available materials one can be more selective in planning a library of materials to fulfill a desired purpose. The "Language and Cognitive Rehabilitation Computer Catalog" serves as a resource for the selection of quality microcomputer products.

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TEACHING TEACHERS PROGRAMMING: THE UNIVERSITY OF CINCINNATI MODEL

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ABSTRACT

Beginning in 1977, the University of Cincinnati decided that classroom teachers could benefit from the ability to program microcomputers. Outgrowth of this commitment led to the formulation of a two-course sequence for classroom teachers in computer programming. This paper describes the courses' development and implementation.

Beginning in 1977, the University of Cincinnati determined that classroom teachers could benefit from knowing how to program computers. The College of Education, in consultation with local school district personnel, began determining appropriate content and teaching methodology to be employed in teacher centered computer programming courses. After examining the curriculum and teaching methods of many generic computer programming courses available at that time, it was decided that a new approach would be far more successful with classroom teachers.

A two quarter sequence was developed based on three basic guidelines:

- course enrollment would be restricted to educators;
- participants would receive "hands-on-experience" utilizing equipment identical to that found in their elementary and secondary schools;
- the content of all written program assignments would be appropriate for use in the participants' classrooms.

Attention to these guidelines formed the rationale for offering courses specific to the needs and interests of teachers. What follows is a description of the two courses which grew out of this effort.

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COURSE I

The purpose of the first course centers on teaching programming commands. Participants first identify a computer assisted instruction (CAI) programming problem and then learn the microcomputer code needed to solve that problem. For example, a teacher may want to design a microcomputer program that would display the name of a state at random and then require the pupil to respond with the state capitol. The first step in writing the program involves a determination of program content, in this case the fifty states and their capitols. Also, it must be determined what will happen if the pupil responds incorrectly. The following possibilities may be appropriate:

- give pupil the correct answer rather than "cul-de-sacing" the student endlessly through the same exercise;
- guarantee that no state comes up twice in a row;
- give the pupil a variety of positive reinforcements;
- keep a record of the number and nature of right and wrong responses;
- correct minor pupil misspellings.

Through this assignment, teachers learn that extensive programs are a series of short single function procedures tied together into one larger unit.

Next, drill lesson components are identified and prioritized. Generally, at this stage simple programs, where the pupil is given an infinite number of tries to correctly name the capitol, are preferred. After programming at this stage has been mastered, the program can be extended to include other capabilities.

Discussion of specific programming commands is integrated next into the course. Using the initial state capitol program as motivation to learn commands promotes understanding. This approach differs significantly from the standard practice in most computer courses where program commands are given prior to any application.

Also covered in the first course, is the creation of microcomputer simulations. To program the microcomputer with this model, teachers must address concerns such as how to ensure proper data entry by the pupil (i.e. as 5% or as .05), the rule for rounding off numerical amounts, and the appropriate table format for output displays. For example, the inflation equation, "principle = principle + principle * inflation rate", is used to determine the amount of money a person must earn to keep up with economic inflation. Teachers learn that simulations have three components: data entry, the mathematical model, and display output. As in the drill and practice programs, tasks are successfully completed prior to advancement into more difficult tasks.

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Course I culminates with instruction as to how one's gradebook can be programmed into the microcomputer. As with previous assignments, teachers must first determine gradebook program content:

- how grades will be entered into the microcomputer;
- how grades will be averaged;
- how grades will be displayed;
- how to weight different grades;
- how to account for missing grades;
- whether to sort the final list alphabetically or by academic rank.

This program can be extended to include display formats such as histograms.

COURSE II

The second course extends the first course by examining models of instruction (inductive and deductive concept, and generalization models) for the purpose of developing tutorial microcomputer assisted instruction lessons on the computer. Teachers learn about curriculum characteristics which lend themselves easily and effectively to computerized instruction. While developing CAI lessons, teachers continue to develop a critical eye for commercially available CAI software. In fact, it is often found that teacher-developed CAI lessons are superior to most commercial materials in terms of instructional design, screen layout, and student/computer interaction.

Formal structured programming where routines are written in modular form is introduced. Special routines are developed to ensure more professional looking CAI programs. For example, teachers are taught how to program the following routines:

- erase parts of a screen;
- time responses;
- reseed the random number generator;
- automatic booting;
- animation and simple screen graphics;
- mixing text and graphics;
- use of special function keys;
- disabling the RESET key to prevent discovery of the program source code.

While many of these routines are sophisticated, teachers generally have no difficulty developing an excellent understanding of programming. More extensive mathematical models in simulations are covered also. Specifically, the whale and plankton population model (Lynch and Rice, 1975) is used as a basis for simulation development. Through this simulation assignment, teachers learn how to scale the output, move the origin of the graph, and reverse the direction of the vertical axis, in addition to how results can be plotted using high resolution graphics.

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Teaching Teachers Programming

As a final project, teachers develop a tutorial lesson or computer simulation, with documentation, for their own classroom students. Sharing of each others' programs has led to additional learnings. Some teachers have been able to publish their programs commercially.

CONCLUSION

The courses described here are a direct result of a collaborative effort between classroom teachers and computer education professors. Modifications in existing courses are made as teachers' needs and interests change. In fact, two new courses, Introduction to Computers (a hardware/software course for computer novices with no programming components), and Assembly Language Programming (a course emphasizing the development of CAI programs with sound and high speed graphics), have been added to the University of Cincinnati's offerings. Curriculum courses in LOGO, Pascal, and data file development also are planned.

Collaboration with local schools extends beyond computer curriculum planning. Often, special sections of these courses are taught within the local schools, with teachers' own computer equipment. This type of inservice training has the added benefit of allowing for more individualized approaches.

The University of Cincinnati's model for teaching teachers computer programming is effective in increasing teacher competency. Other teacher education institutions can benefit from this model.

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ADMINISTRATIVE USES FOR A MICROCOMPUTER IN TEACHER EDUCATION: THE KENT STATE EXAMPLE

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ABSTRACT

Utilization of microcomputing equipment in a college office of teacher education can encourage more efficient and creative program administration. The paper describes a variety of microcomputer applications, while drawing upon the successful Kent State University model for examples. Several cautions are suggested for making similar applications in other settings.

The introduction of microcomputers into college administration offices is transforming professional roles. In addition to improving the quality of routine operations, utilization of microcomputer equipment encourages more efficient and creative administration of teacher education programs. This article describes some actual applications of a microcomputer system[1] in Kent State University's office of teacher education. The applications are organized by the two major categories of processing text and processing records. Each will be described, with case examples, as to the effect upon administrative responsibilities.

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[1] *The Kent State microcomputer system has a 256K memory unit, a 96 character keyboard, a monitor which displays 25 lines at a time, a dual disk drive unit which uses 8" floppy diskettes. Each work station has a letter quality printwheel printer that prints 60 characters per second and has both an automatic sheet-feed handler for printing letters and other documents and a tractor feed for continuous paper.*

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Administrative Uses

PROCESSING TEXT

There are three types of text processing applications which teacher education administrators will find useful. The major types to be described are: preparing reports, providing documentation for program review teams, and writing professional articles or other materials.

Preparing Reports. Many administrative reports contain tables of data. A good text processing system allows the operator to format and re-format numerical and text tables. Spacing columns of figures equally, interchanging columns or rows, and calculating totals, percents or averages are but a few of the text processing features which are available. Such features allow administrators to try different ways of summarizing large data banks. Most important, the original content of a table can be accurately retained throughout the entire revision process.

Another text processing feature that facilitates systematic reporting is the reduction of paper copies that must be kept on file. A single 8" diskette stores upwards of 500 pages of single spaced text. Paper copies can be printed as needed, in contrast to being printed in anticipation of possible future need. In many situations viewing the document on the monitor screen is sufficient, which can be accomplished more quickly than searching through a file drawer.

Preparing for Program and Accreditation Reviews. Frequent program reviews for external agencies, each with different sets of guidelines for preparing reports and supporting documentation, present teacher education administrators with a major task. For a college of education the size of Kent State, the task requires that institutional reports and documentation be developed for more than fifty undergraduate certification areas in addition to numerous graduate programs. For several reasons this material is more effectively processed on a microcomputer.

By using the microcomputer to prepare final documents, consistency in format and appearance can be maintained. Second, time saving features of the microcomputer make it possible for clerical staffs to keep up with daily services for faculty and students while the voluminous accreditation documents are being prepared. Also, portions of documents prepared for previous reviews are easily and quickly retrieved for use by subsequent writing teams. By simply giving instructions to the computer operator, relevant portions of one document may be copied into the new document quickly and error free.

During site visits, the microcomputer can be used to satisfy requests for information from the accreditation review team. It also can be used to prepare and revise drafts of reports throughout the review process, which enable the team to prepare a finished report while on site.

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Facilitating Professional Writing. If one can type, one can learn to use a microcomputer word processing system to facilitate composition (see Hennings, 1983 and Glatzer, 1981 for a more complete discussion of word processing applications). Electronic cutting and pasting is a very useful capability. The ability to insert or delete text, relocate words, sentences, paragraphs, pages, and tables, allows one to see immediately how the resulting edited material will appear.

In addition, word processing systems often have a feature which checks spelling against a limited standard dictionary. Dictionaries for other languages, as well as for technical terms, also may be available. Although this feature will not eliminate spelling errors due to improper use of words, it greatly reduces the number of "typos" in a document.

PROCESSING RECORDS

Compliance with Ohio standards for teacher education institutions requires that large numbers of student records be processed efficiently. Four types of applications for records processing will be described: monitoring student progress from entry into program until graduation; monitoring participation in field or clinical experiences prior to student teaching; and monitoring student teaching placements; and tabulating responses to a graduate survey.

Monitoring Student Progress. In most teacher education programs, there are several checkpoints where student progress is evaluated. At Kent State, plans are underway to use the microcomputer system to monitor progress systematically at each of these checkpoints and to provide helpful services to students and faculty based on the outcomes. Two applications that have been implemented for specific groups of students illustrate the potential.

Using specific criteria, a diskette file was created to identify high achieving students. Individualized letters, prepared by the computer, invited these students to several events where encouragement to remain in teacher education was emphasized. Attendance at these events was entered into the microcomputer file for use in planning future events.

Another diskette file was created for all freshmen who named education as their intended major. A computerized letter outlining College of Education procedures was sent to each student. This file also can be used to identify and advise students who have completed a certain number of credit hours, but who have not completed requirements that are associated with that checkpoint. Program counselors and advisors also have used the microcomputer to prepare lists of students with specific academic problems.

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Administrative Uses

Monitoring Field/Clinical Records. The task of monitoring hours accumulated by students in field and clinical experiences can be both large and complex. In the Kent State program there are approximately 150 different courses which include field or clinical experience components. The number of clock hours accumulated in a given course varies from 3 to 300 hours. Moreover, at any time, there are approximately 2,000 active students who, depending on their majors and certification areas, may accumulate from 300 to 700 clock hours prior to student teaching. In this complex monitoring situation, the microcomputer is used to process each student's record of accumulated field/clinical hours.

A diskette file contains a record for each active student. When grade reports are received, a code number for each course passed that includes a field or clinical experience component is entered into the file. When the student's record is printed, the computer uses the code numbers to retrieve the specific requirements completed from a separate "library." This procedure facilitates record processing and allows revisions in requirements to be handled.

A summary report of each student's status is prepared on the microcomputer each semester, thus enabling office staff to respond quickly to inquiries from students and faculty advisors. For instance, when a student prepares an application for student teaching, a report of field and clinical hours, in addition to other documentation regarding other requirements, can be printed immediately for the faculty screening committee. Upon graduation a report of completed field and clinical hours is printed and placed in the student's permanent record.

Monitoring Student Teaching. When a student submits a student teaching application, a record is created in the student teaching diskette file. This record includes grade level and site preferences for placement, major, and college supervisor. Applications are then matched with possible site placements. At Kent State, this matching process originally was done by rearranging hundreds of 4x6 cards spread out on conference tables. Now rearranging can be completed electronically with a more systematic consideration of a variety of parameters.

For example, student teachers may do their practica during any of three possible terms within a regular semester, thus making assignment of faculty load credit for student teacher supervision extremely complicated. A microcomputer program has made these complexities more manageable by using tentative placements to project supervision load credit. With this program, faculty assignments also can be made earlier, thereby allowing additional time for hiring temporary supervisory personnel.

Another example involves the collection of evaluation materials during student teaching. By using a diskette file to store information, the collection process can be more efficiently

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monitored. Supervisors who are delayed in returning materials are sent reminders systematically. Periodic reports of non-returned evaluations are prepared for office staff. The administrative staff now can deal with this task in a more personalized manner.

Tabulating Survey Results. Graduate follow-up evaluations also are administrated more easily using the microcomputer. Inasmuch as questionnaires are used for follow-up at Kent State, a mailing list for all previous year graduates was put on a diskette. The microcomputer then was used to print individualized cover letters and mailing envelopes. Returns were monitored by the microcomputer to ensure that follow-up mailings were sent only to those who had not returned their questionnaires.

A FEW CAUTIONS

While microcomputers can facilitate more efficient and time effective strategies for completing administrative tasks, there are several critical areas which must be addressed for successful implementation. Based on the Kent State experience, comments will be made about gathering information relative to potential uses for microcomputing, implementing changes in staff responsibilities if microcomputing equipment is added, and monitoring implementations.

Gathering Information. Conducting an analysis of information needs requires technical expertise. In a college or university setting such expertise is generally available, and it should be utilized. The teacher educator, however, should be wary of delegating information gathering to information processing specialists without personally becoming knowledgeable as to the uses of microcomputers. An introductory book can be helpful (e.g., Rinder, 1981), as are discussions with other faculty members who have had experience with microcomputer applications.

Information must be gathered as to how difficult it will be for staff to use a microcomputer competently. Careful attention to this planning phase may save much time and avoid unnecessary frustration during the implementation phase. Under no circumstances should teacher educators rely on computer sales representatives for information at this stage.

Implementing Changes. Given the current economic climate, it is likely that *existing* personnel will need to be trained to use the microcomputer equipment, rather than employing additional word processing specialists. Training existing personnel may take a considerable amount of time. Moreover, while training staff to produce routine memos can be accomplished in several hours, training in more complicated skills such as complex text processing and development of procedures for records processing will take much longer.

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Administrative Uses

Making technical assistance available to an operator on demand is another critical variable which tends to foster successful implementation. It is very frustrating for a veteran office worker to be unable to produce satisfactory work on new equipment. Although the computer firm may have assistance available by phone or by appointment, having someone in the office who can respond immediately to problems during training has proven to be very effective. Also, for more sophisticated systems the training should be modular. Different operators may have specific functions which can be learned readily without having to become proficient with *all* functions.

It is essential to provide constant emotional support for operators in training. Administrative expectations of an operator's ability to utilize equipment usually exceed a new operator's expertise by six months or more. Providing patient support will lead to expectations being fulfilled.

Monitoring Implementation. It is important to develop a work station guide that contains instructions for completing each task that is performed with the equipment. These instructions should contain descriptions of files that are used and sample documents that are produced.

It is helpful to keep a log indicating the time required to complete various microcomputer applications. A log can be maintained on each diskette so that the operator can enter the beginning and ending time for each completed task. This information is helpful for scheduling daily tasks efficiently and for helping administrators plan realistic completion times for lengthy projects.

SUMMARY

In summary, use of microcomputing equipment in an office for teacher education can help administrators and faculty provide services to students more systematically and creatively. Text can created, revised, and manipulated to produce useful documents quickly and with fewer errors. Records can be created for each student, and then sorted and analyzed quickly and accurately in a variety of ways. To develop the potential of microcomputing, however, careful attention must be given to satisfying the needs of all people who work in the teacher education setting.

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A MODEL FOR COMPUTER LITERACY STAFF DEVELOPMENT IN TEACHER EDUCATION: MIAMI UNIVERSITY MEETS THE CHALLENGE

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ABSTRACT

Ohio colleges and universities have been charged with preparing computer literate teachers. The Department of Teacher Education at Miami University rose to this challenge. The article describes the model used for staff development in computer literacy.

American educators face an exciting leadership challenge in a society which is in the process of converting from an industrial to an information-based economy. The staggering fact that 90 percent of the American work force will be employed in an automated office by the end of the century, forces educators to quickly determime how the generation of children in today's schools will be prepared to meet that phenomena. Immediately the question of who will prepare the preparers, the current and future teachers of American society, must be addressed.

Ohio schools, colleges, and universities have responded to this training challenge. The Educational Computer Consortium of Ohio has provided a network for teachers to learn about computer uses and public domain software. Boards of Education, parent-teacher organizations, and state agencies have contributed dollars for hardware and software. A vital leadership role has been assumed by Ohio Universities, especially schools and colleges of education, who realize that they provide the implementation link for both preservice and inservice teachers. The faculty of Miami University felt the pressure to act quickly to assist educators in their efforts to maximize the advantages of this new technological tool. What follows is a detailed account of that effort.

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PHASE I: AWARENESS GOALS & ACTIVITIES

In the Spring of 1980 the Department of Teacher Education at Miami University voiced a commitment to fostering national computer literacy. Four computer literacy goals were established.

1. All faculty in the Department of Teacher Education would become computer literate.

2. All faculty would implement computer applications into their respective disciplines.

3. All Teacher Education students would be computer literate upon graduation.

4. The Department of Teacher Education would develop a microcomputer center to serve both its preservice and inservice students and teachers.

These goals would serve as the foundation for all microcomputer developments.

A variety of computer awareness activities provided the first steps toward meeting these goals. Educational consultants who had previous experience with mainframe terminals or microcomputers were invited to conduct faculty awareness seminars. A computer literacy unit, which required the use of six microcomputers, was developed and taught to fourth graders in the University's Laboratory School. Interested faculty, parents, and college students were invited to observe the unit's development and the fourth graders' progress. Various faculty members attended professional meetings with organizations such as the Association for Educational Data Systems and Association for the Development of Computer Instruction in Schools. Software was solicited from commercial courseware vendors for faculty, who then reviewed and tested the software with children and teachers. Many informational articles submitted to professional journals grew out of this activity. University administrators gave departmental funding priority to microcomputer hardware and software purchases. This move provided easier faculty access to equipment for their own literacy needs. At this time, concerted efforts also were made toward the development of a microcomputer center.

As implementation of the Teacher Education Department's goals progressed, a series of planned staff development seminars were held to augment individual efforts. These seminars included the topics of:

- beginning programming;
- the state of the art of microcomputing in Ohio Schools;
- quality software demonstration and guidelines for selection;

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- use of the computer in college classrooms and laboratories;
- word processing with a microcomputer.

These seminars were conducted by Miami University faculty and representatives from Educational Computer Consortium of Ohio.

Several additional computer activities occurred during this phase. A faculty member participated in the "Computer Uses in Teacher Education Conference" held at Ohio University. The department also developed a three credit hour microcomputer course for upper level and graduate teacher education students. Topics covered in the course included basic programming, computer uses in the classroom, and software selection. Inservice awareness sessions, and cooperatively developed courses were presented by faculty for schools in the Southwestern Ohio area. Faculty members sought grant contracts from outside sources to supplement educational budgets. "College for Kids" and "College for Youth" programs were developed by the faculty to provide microcomputer access for young people. Department administrators converted their data management tasks of scheduling, budgeting, and record keeping to microcomputer programs.

PHASE II: GAINING MOMENTUM

In the fall of 1982, Miami University President Paul Pearson declared that by 1986 all Miami graduates would be computer literate. This announcement strengthened the Department of Teacher Education goals, now two years underway.

In the Fall of 1983, computer activities were systematically incorporated into methods coursework. Having increased their own knowledge of computer usage, teacher education faculty developed a software library and provided leadership in the development of a divisional microcomputer laboratory. A faculty member was assigned as halftime director to the laboratory, and another faculty member was given load reduction time to serve as edpartmental computer coordinator. Additional hardware and software purchases continued as a major budget priority, with the goal of acquiring one microcomputer per faculty member by 1988.

An Ad Hoc Advisory Committee for Computer Literacy held two meetings with the Divisional Dean to consider the university guidelines and to suggest implementation strategies. After consultations with the curriculum committee, departmental representatives devised a scope and sequence strategy for developing computer literacy in both undergraduate and graduate students. A three-tiered model of course content evolved. The first level course covers an introduction to computers. The second level course surveys computer applications. The third level involves several specialized computer courses dealing with applications specific to major content areas. In addition to these core courses, other teacher education courses include specialized microcomputer application sections.

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PHASE III: FUTURE GOALS

As the mid-eighties approach, teacher educators at Miami University are emphasizing the teacher's changing role with microcomputer availability. Research (Bracey, 1982) has shown that the use of microcomputers assists students to learn more at an individualized pace. Microcomputers also can be used as a teaching resource for problem solving, developmental and remedial instruction, word processing, creativity, writing with word processing, motivation, skill development through structured reinforcement, and simulation. Miami University faculty members are sharing this knowledge with university students in methods courses in various ways. For instance, quality sample courseware in each subject area is demonstrated. Instructors often incorporate computers in coursework objectives and activities, thereby providing a model for future teachers to emulate.

Research also is underway at Miami University to determine the effects of microcomputers on learning and the effects of programming on problem solving skills and teaching efficiency. For instance, a touch panel is being tested with three and four year old children in the Divisional Child Studies Laboratory. Educational software also is being developed.

CLOSING VIEWS

How did this effort at the University of Miami succeed so quickly when the challenge was so demanding? On the one hand, the unique and insatiable desire to learn the new technology was present in the faculty. A supportive administration provided necessary resources, planning, and inservice leadership. Faculty looked at research, listened to futurists, sensed the societal demand, and went to work.

Having placed microcomputer technology high on the educational priority list, Miami University teacher educators are now preparing teachers for new opportunities in changing educational environments. Perhaps the strength of the computer literacy movement in teacher education at Miami University can be most attributed to the tremendous amount of informal networking which took place among faculty, administration, and students. They learned together as they taught together, each helping the other to fill in the gaps of newly acquired knowledge about the use of the microcomputer in teacher education.

When education set forth on the historic journey toward full computerization in the decade of the 1980's, most teacher educators were beginners. We've come a long way, but the challenge and promise of the microcomputer in education is still great.

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THE APPLICATION OF MICROCOMPUTERS TO TEACHER EDUCATION